

RESEARCH ARTICLE

Cognitive Dissonance in Investors' Reactions to Earnings News: The Moderating Role of Liquidity, Financial Reporting Credibility, and Earnings Sustainability

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ABSTRACT

Based on cognitive dissonance bias, investors tend to ignore earnings news that is inconsistent with their emotional state. This bias causes investors to be unresponsive to good (bad) earnings news under pessimistic (optimistic) conditions. Stock liquidity, financial reporting quality, and earnings persistence can influence investors' reactions to earnings news. Accordingly, this study aims to examine the role of stock liquidity, financial reporting credibility, and earnings persistence in investors' cognitive dissonance toward earnings news. The research sample includes 127 companies listed on the Tehran Stock Exchange over the period from 2011 to 2022. To test the hypotheses, multivariate regression models were employed, and the Principal Component Analysis (PCA) method was used to construct a composite investor sentiment index. According to the findings, investors' reactions to good and bad earnings news are asymmetric. In optimistic sentiment conditions, investors respond positively to good earnings news and remain unresponsive to bad news. Conversely, under pessimistic sentiment, they react negatively to bad news and show muted reactions to good news (indicating the presence of cognitive dissonance). Moreover, the results indicate that improved financial reporting credibility reduces cognitive dissonance. However, stock liquidity and earnings persistence do not have a significant impact on mitigating cognitive dissonance. When financial information becomes more accurate and reliable, investors' cognitive errors and biases diminish, and their decisions align more closely with economic realities. This contributes to the reduction of cognitive dissonance and, in a way, weakens its effects.

Introduction

In financial markets, investors sometimes make decisions influenced by emotions, and this cognitive bias can lead to the deviation of stock prices from their intrinsic value. Under optimistic conditions, investors may ignore negative information and overvalue stocks beyond their true worth. Conversely, during pessimistic periods, they tend to disregard positive news and undervalue stocks below their actual value. This behavior can be explained by "cognitive dissonance," a concept that indicates individuals tend to dismiss information that conflicts with their current feelings and beliefs (Di Tella et al., 2015).

One of the most important theories in this area is Festinger's cognitive dissonance theory (Festinger, 1957). He believed that encountering contradictory beliefs creates mental tension, which can lead to attitude change. Individuals usually accept information consistent with their dominant feelings and ignore opposing information (Perlovsky et al., 2013). According to this view, when the market is influenced by optimism, investors show little reaction to negative news because such information is incompatible with their positive sentiments. Similarly, in pessimistic periods, investors typically have a limited reaction to positive news and are more influenced by negative information. The reason for this behavior can be found in the mechanism of cognitive dissonance, as people tend to overlook information that increases contradictions in their beliefs. This indifference to unfavorable news can be termed a "silent reaction." Based on this analysis, it can be expected that investors' responses to positive and negative news will be asymmetric, such that information aligned with prevailing sentiments has a greater impact on their decision-making.

Differential stock price reactions to new information may have their roots in liquidity levels (Hou & Moskowitz, 2005; Ng et al., 2008). This means that in optimistic periods, stocks receiving negative news, or during pessimistic periods, stocks receiving positive news, are likely to have lower liquidity. Under such conditions, this news is not fully reflected in their prices. Therefore, liquidity can act as a substitute factor for cognitive dissonance and explain the asymmetric stock return reactions. Hence, liquidity might serve as an alternative explanation for cognitive dissonance.

Reliable financial reporting may be associated with reducing anomalies caused by cognitive dissonance. Studies have shown that investors react more strongly to credible financial information (Ng et al., 2013). Additionally, when financial reports have lower credibility,

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investor sentiment intensifies (Firth et al., 2015). Therefore, it can be expected that high-quality financial reporting helps reduce cognitive dissonance. Overall, evidence indicates that increasing the credibility level of financial reports can mitigate cognitive dissonance.

Another factor affecting cognitive dissonance is earnings persistence. A study by Riedl et al. (2021) shows that investors expect lower profitability during pessimistic sentiment periods, whereas in optimistic conditions, their forecasts of earnings persistence increase. Therefore, a weak reaction to positive earnings news is more likely to be observed in firms with unstable earnings. Conversely, companies with more persistent earnings and more credible financial information should respond positively to good news even during pessimistic periods. This finding aligns with the hypothesis that greater earnings stability reduces investors' muted reaction to positive news under pessimism. Consequently, investors' focus on carefully examining financial information, including earnings persistence, can explain why positive news is often ignored during pessimistic periods.

Based on the aforementioned points, this research seeks to answer whether cognitive dissonance exists in investors' reactions to earnings news during optimistic and pessimistic sentiment periods. It also investigates how liquidity, financial reporting credibility, and earnings persistence affect investors' cognitive dissonance. Understanding various dimensions of cognitive dissonance enables a better explanation of investors' irrational behavior. Moreover, the reasons behind asymmetric market reactions to earnings news will be clarified, providing regulators with a basis to design policy tools and disclosure mechanisms aimed at improving market efficiency and reducing the adverse effects of investor sentiment. The results of this study will assist financial managers in better analyzing investor behavior at the market level and achieving improved investment performance and economic planning through enhanced financial reporting credibility.

This study is innovative both theoretically and practically. It examines a lesser-known behavioral factor, cognitive dissonance, and analyzes it in the real context of the Iranian capital market. Additionally, it aims to demonstrate, by integrating psychological concepts with variables such as stock liquidity, financial reporting credibility, and earnings persistence, how these factors can moderate the intensity of cognitive dissonance and investors' emotional reactions to earnings news. This multidimensional approach not only enriches the domestic behavioral finance literature but also provides a scientific foundation for better investor behavior analysis and supervisory decision-making to enhance market transparency and efficiency. The paper proceeds by first reviewing the theoretical foundations and literature, followed by the research methodology and findings, and finally presents conclusions and recommendations.

Theoretical Framework

Numerous theories that seek to explain irrational investor behavior in financial markets are rooted in cognitive-behavioral psychology, including Prospect Theory and various cognitive biases. Empirical studies have demonstrated that cognitive dissonance—referred to by Chang et al. (2016) as one of the most significant advances in social psychology—has a notable impact on the way earnings information is evaluated, particularly in developing economies (Chang et al., 2016). According to the theory of cognitive dissonance, first proposed by Festinger (1957), individuals actively attempt to reduce internal inconsistencies by adjusting their attitudes, beliefs, or behaviors. As one of the foundational theories in social psychology, it emphasizes the human drive toward consistency between beliefs and realities. When a conflict arises, it generates psychological tension, which in turn motivates efforts to reduce it by changing one's outlook or behavior. The greater the dissonance, the stronger the individual's drive to reduce it (Harmon-Jones & Mills, 2019).

Numerous studies have investigated how decision-making affects subsequent attitudes and behaviors, within the framework of cognitive dissonance theory. Based on this theory, it can be argued that earnings announcements inconsistent with investors' current sentiment generate cognitive dissonance, leading them to ignore such news to maintain internal consistency. Consequently, investors tend to exhibit muted reactions to good (bad) earnings news when it contradicts their pessimistic (optimistic) sentiments. The term *muted reaction* refers to the lack of stock price response following the announcement of good or bad earnings news. When investors are optimistic, they respond favorably to good earnings news—consistent with their prior expectations—which is quickly reflected in stock prices. In contrast, bad earnings news, which contradicts optimistic sentiment, fails to elicit an immediate or significant price reaction. In other words, under optimistic sentiment, investors respond positively to good earnings and exhibit muted reactions to bad news. Under pessimistic sentiment, however, bad earnings news aligns with investor expectations and thus receives a negative reaction, while good news, inconsistent with the prevailing sentiment, elicits a muted response (Li et al., 2023). Based on this theoretical foundation, the first three hypotheses of the study are proposed as follows:

- **Hypothesis 1:** Investor reactions to good and bad earnings news are asymmetric.
- **Hypothesis 2:** Under optimistic sentiment, investors react positively to good earnings news and exhibit muted reactions to bad news.
- **Hypothesis 3:** Under pessimistic sentiment, investors react negatively to bad earnings news and exhibit muted reactions to good news.

Stock liquidity refers to the ease with which shares can be bought or sold in the market without causing significant changes in price. High liquidity indicates that new information is rapidly incorporated into stock prices, and investors can execute trades with low transaction costs and minimal price impact (Amihud & Mendelson, 1986). During periods of pessimism, investors tend to show weaker responses to positive earnings news due to uncertainty and fear of losses, leading them to ignore or cautiously interpret favorable information (Baker & Wurgler, 2006). Such muted responses may stem from concerns about information asymmetry or the potential manipulation of financial statements. Increased stock liquidity can reduce these muted reactions. This is because in highly liquid markets, information is incorporated more rapidly, and trading costs are lower, giving investors greater confidence to respond to good news (Chordia et al., 2001). Higher liquidity also enhances investor confidence by assuring them of easy market entry and exit, reinforcing trust in market mechanisms. In this sense, liquidity can act as a moderating factor that diminishes the negative effects of pessimistic sentiment by allowing positive information to be promptly reflected in prices and encouraging faster, more confident investor reactions (Fang et al., 2009). As a result, it is expected that in highly liquid markets, investor muted reactions to good earnings news will be less pronounced—even in times of pessimistic sentiment. Previous studies have shown that high stock liquidity helps mitigate the effects of cognitive dissonance and encourages investors to respond more promptly to new information (Kim & Verrecchia, 1994). Therefore, the role of liquidity in moderating the relationship between

sentiment and reaction to earnings news is a key aspect in understanding investor behavior under different market conditions. Based on the theoretical foundations discussed, the fourth and fifth hypotheses are as follows:

- **Hypothesis 4:** Higher stock liquidity weakens investors' muted reaction to good earnings news under pessimistic sentiment.
- **Hypothesis 5:** Higher stock liquidity weakens investors' muted reaction to bad earnings news under optimistic sentiment.

Financial reporting credibility refers to the degree of reliability and accuracy of the financial information disclosed by firms, which significantly influences investor decision-making (Dechow et al., 2010). High-quality financial reporting assures investors that the information reflected in financial statements is accurate, complete, and free from material misstatements or bias—whether intentional or unintentional (Francis et al., 2004). Thus, credible financial reporting plays a vital role in shaping investors' expectations and behaviors. When investor sentiment is pessimistic, their reaction to positive signals—such as better-than-expected earnings announcements—tends to be weak and cautious (Baker & Wurgler, 2006). Such pessimism is often driven by uncertainty regarding the accuracy of financial information and concerns about potential earnings manipulation. Consequently, positive earnings news in such an environment is often overlooked, leading to muted investor responses. However, when financial reporting is perceived as credible, investors are more likely to trust the information provided (Penman & Zhang, 2002). This trust increases the likelihood that they will treat positive earnings news as more credible and respond with less hesitation. In this sense, financial reporting credibility can mitigate the adverse effects of pessimistic sentiment by encouraging investors to take positive news more seriously. Put differently, credibility in financial reporting serves as a trust-building mechanism, helping investors assess positive earnings announcements based on economic fundamentals, rather than being overly influenced by their negative emotions (Sloan, 1996). Hence, it is expected that greater financial reporting credibility reduces the intensity of investors' muted reactions to good earnings news under pessimistic conditions. Prior studies have shown that credible reporting reduces information asymmetry and enhances financial transparency—factors that directly influence how investors process information and form expectations (Richardson et al., 2005). Therefore, examining the role of reporting credibility in shaping behavioral investor responses, especially under sentiment-driven conditions, is essential for a deeper understanding of market dynamics. Accordingly, the sixth and seventh hypotheses are proposed:

- **Hypothesis 6:** Financial reporting credibility weakens investors' muted reaction to good earnings news under pessimistic sentiment.
- **Hypothesis 7:** Financial reporting credibility weakens investors' muted reaction to bad earnings news under optimistic sentiment.

Earnings persistence, as one of the qualitative attributes of accounting information, refers to the continuity and predictability of earnings over future periods (Dechow et al., 2010). Persistent earnings indicate higher earnings quality and greater reliability for decision-making. Investors place considerable emphasis on earnings persistence when evaluating firm performance, as unstable earnings may reflect earnings management practices or the influence of nonrecurring events, which hinder informed decision-making (Richardson et al., 2005). Under pessimistic sentiment, investors tend to react cautiously to positive news due to a heightened perception of risk and potential loss (Baker & Wurgler, 2006). This pessimism often results in muted or weak reactions to even favorable earnings news. However, earnings persistence can serve to moderate this effect. When investors perceive earnings to be sustainable, they are more likely to trust the financial information and take positive announcements more seriously—even in pessimistic conditions (Francis et al., 2004). In other words, earnings persistence functions as a trust-enhancing factor, helping to reduce the influence of negative sentiment and encouraging a more rational response to positive news. Therefore, it is expected that the presence of strong earnings persistence reduces the intensity of muted reactions to good earnings news, as investors perceive reported profits to be more credible and repeatable (Penman & Zhang, 2002). Prior studies have demonstrated that earnings quality and persistence play a central role in shaping investor expectations and can help moderate sentiment-driven behavioral biases (Sloan, 1996). For this reason, investigating the role of earnings persistence in investor behavior, particularly in sentiment-laden market environments, is highly relevant in financial and accounting research. Accordingly, the eighth and ninth hypotheses are proposed:

- **Hypothesis 8:** Earnings persistence weakens investors' muted reaction to good earnings news under pessimistic sentiment.
- **Hypothesis 9:** Earnings persistence weakens investors' muted reaction to bad earnings news under optimistic sentiment.

Empirical Literature Review

Ali et al. (2024) found that investors often make financial decisions based on sentiment. Investor sentiment significantly affects financial markets, frequently causing stock prices to deviate from their intrinsic values. Furthermore, factors such as information search, anchoring, herding behavior, agency problems, and overconfidence all substantially influence investor behavior. Their findings also confirmed the irrationality of investors and the inefficiency of stock markets. Li et al. (2023) discovered that due to cognitive dissonance, investors tend to ignore earnings news that contradicts their prevailing sentiments, resulting in muted return responses to earnings announcements. They further found that higher valuation uncertainty, greater earnings persistence, and increased liquidity exacerbate cognitive dissonance. However, their findings did not support the idea that high-quality financial reporting reduces cognitive dissonance. Komalasari et al. (2023), incorporating regret and cognitive dissonance factors, revealed several insights: First, the principle of "follow your own signal" tends to dominate over herd behavior. However, when information asymmetry is present, herding behavior becomes more pronounced. Second, there exists a bilateral interaction between information asymmetry and regret, resulting in atypical behavioral patterns. Third, a three-way interaction among information asymmetry, regret, and cognitive dissonance was observed. Riedl et al. (2021) investigated the link between investor sentiment and expectations about future earnings, providing evidence of mispricing at the market level driven by sentiment. They predicted that investors perceive losses as more persistent during periods of low sentiment, and less persistent during periods of high sentiment. Similarly, earnings persistence is viewed as lower (higher) in low (high) sentiment periods, with stronger effects for loss-making firms than profitable ones. Seok et al. (2019) found that investor sentiment is positively associated with short-term stock returns. This result contrasts with findings of a long-term relationship in developed markets. Furthermore, the positive relationship between sentiment and realized returns was more prominent for firms with harder-to-value characteristics—such as smaller firms, more volatile firms, firms with higher book-to-market ratios, unprofitable firms, distressed firms, and firms with limited arbitrage activity.

Eyshi Ravandi et al. (2023) found that optimistic investor sentiment has a positive and significant effect on stock returns, whereas illiquidity negatively and significantly affects returns. They also concluded that effectively managing investor sentiment and improving liquidity can enhance stock performance and contribute to financial market stability. Hajian Nejad et al. (2022) observed that in high-sentiment firms, stock returns are more sensitive to positive earnings news, while in low-sentiment firms, returns are more sensitive to negative earnings news. Their findings emphasize the informational content of earnings announcements and remind investors to remain cautious in irrational market environments and be mindful of overreacting to both positive and negative earnings news. Kamyabi and Javady Nia (2021) found that as investor sentiment intensifies, companies take strategic actions to mitigate behavioral biases—such as expediting the release of bad news, recognizing economic losses early, delaying good news announcements, and applying more conservative revenue recognition. These actions are intended to reduce future risks arising from sentiment-driven misjudgments. Haghi and Allahyari (2022) showed a positive and significant relationship between investor sentiment and excess returns on the Tehran Stock Exchange. Hence, they recommend that company managers pay close attention to sentiment indicators—such as closed-end fund discounts, mutual fund cash flows, the proportion of speculative stocks in mutual funds, share buybacks, and turnover ratios—to generate excess returns. Vahedian et al. (2022) demonstrated a negative and significant relationship between investor sentiment and managerial forecast bias. Specifically, when investor sentiment is optimistic, managerial earnings forecasts are less biased but tend to be overly positive.

In light of the theoretical framework and empirical literature reviewed above, this study offers several innovations compared to prior research on investor sentiment and cognitive dissonance. Most domestic studies related to cognitive dissonance have been conducted in the realm of social sciences, and the phenomenon has rarely been explored within the context of behavioral financial accounting. Thus, there has been no prior domestic research examining the moderating roles of liquidity, financial reporting credibility, and earnings persistence on investors' cognitive dissonance under varying market sentiments. In this study, not only is the impact of cognitive dissonance on investor reactions to earnings news under optimistic and pessimistic sentiment conditions investigated, but also the underlying dimensions of cognitive dissonance theory—such as liquidity, credibility of financial reporting, and earnings persistence—are thoroughly examined.

Research Methodology

This study is applied in terms of purpose and descriptive-correlational in terms of nature. To test the hypotheses, multivariate regression models and Eviews12 and Stata17 were used. The statistical population includes companies listed on the Tehran Stock Exchange during the period from 2011 to 2022. The sample consists of companies that meet the following criteria: they were listed on the exchange before 2011; for comparability, their fiscal year ends on March 20; due to the different nature of operations, they are not insurance companies, banks, financial intermediaries, or investment firms; the required quarterly data for calculating variables during the study period are available; and their stock trading was not suspended for more than four months in any year. Based on these criteria, 127 companies were selected as the final sample.

Research Models

To test the hypotheses, regression models from the study by Li et al. (2023) were followed. According to the first hypothesis, investors' reactions to good and bad earnings news are asymmetric. To test this hypothesis, the regression model described by equation (1) is used.

$$CAR_{i,t} = \beta_0 + \beta_1 GoodNews_{i,t} + \beta_2 BadNews_{i,t} + \beta_3 Lreturn_1M_{i,t} + \beta_4 Early_{i,t} + \beta_5 Late_{i,t} + \beta_6 Retvol_{i,t} + \beta_7 Size_{i,t} + \beta_8 BM_{i,t} + \beta_9 Leverage_{i,t} + \beta_{10} GoodNews^2_{i,t} + \beta_{11} BadNews^2_{i,t} + \beta_{12} GoodNews_{i,t} \times MktPE_{i,t} + \beta_{13} BadNews_{i,t} \times MktPE_{i,t} + \varepsilon \quad (1)$$

CAR is the cumulative abnormal return, GoodNews and BadNews represent positive and negative earnings news, respectively, Lreturn_1M is the stock return in the month before the earnings announcement, Early is a dummy variable equal to one if the company's earnings announcement date falls in the first quintile of a given financial quarter, and zero otherwise, Late is a dummy variable equal to one if the company's earnings announcement date falls in the last quintile of a given financial quarter, and zero otherwise, Retvol is the standard deviation of the company's monthly returns over the 12 months before the earnings announcement date, Size is the firm size, BM is the book-to-market ratio of the stock at the end of each quarter, Leverage is financial leverage, GoodNews² is the square of GoodNews, BadNews² is the square of BadNews, MktPE is the price-to-earnings ratio.

Coefficients β_1 and β_2 represent investors' reactions to good and bad earnings news, respectively. According to the first hypothesis, β_1 is expected to be positive and significant, and β_2 is expected to be negative and significant.

To test hypotheses two and three, the regression model described by model (2) is used:

$$CAR_{i,t} = \beta_0 + \beta_1 GoodNews_{i,t} + \beta_2 BadNews_{i,t} + \beta_3 GoodNews_{i,t} \times SentH(L)_{i,t} + \beta_4 BadNews_{i,t} \times SentH(L)_{i,t} + \beta_5 Lreturn_1M_{i,t} + \beta_6 Early_{i,t} + \beta_7 Late_{i,t} + \beta_8 Retvol_{i,t} + \beta_9 Size_{i,t} + \beta_{10} BM_{i,t} + \beta_{11} Leverage_{i,t} + \beta_{12} GoodNews^2_{i,t} + \beta_{13} BadNews^2_{i,t} + \beta_{14} GoodNews_{i,t} \times MktPE_{i,t} + \beta_{15} BadNews_{i,t} \times MktPE_{i,t} + \varepsilon \quad (2)$$

According to the second hypothesis, under optimistic sentiment conditions, investors react positively to good earnings news and show a muted reaction to bad news. Likewise, according to the third hypothesis, under pessimistic sentiment conditions, investors react negatively to bad earnings news and show a muted reaction to good news. To test these two hypotheses, the study period is divided into two parts: optimistic and pessimistic sentiment periods, and two dummy variables, SentH and SentL, are defined. During optimistic periods, SentH

equals one and zero otherwise. During pessimistic periods, SentL equals one and zero otherwise. Equation (2) is estimated twice separately, once with SentH for the second hypothesis and once with SentL for the third hypothesis. According to the second hypothesis, it is expected that the coefficient β_3 is positive and significant during optimistic sentiment periods, and β_4 is not significant. The insignificance of β_4 indicates a muted (no) reaction of investors to bad news under optimistic sentiment conditions. Similarly, according to the third hypothesis, β_4 is expected to be negative and significant during pessimistic sentiment periods, and β_3 is expected to be insignificant. The insignificance of β_3 indicates a muted reaction of investors to good earnings news under pessimistic sentiment conditions.

According to the fourth and fifth hypotheses, increased stock liquidity weakens the muted reaction of investors to good (bad) earnings news under pessimistic (optimistic) sentiment conditions. To test these two hypotheses, the regression model (3) is used.

$$CAR_{i,t} = \beta_0 + \beta_1 GoodNews_{i,t} + \beta_2 BadNews_{i,t} + \beta_3 Liq_{i,t} + \beta_4 GoodNews_{i,t} \times Liq_{i,t} \times SentH(L)_t + \beta_5 BadNews_{i,t} \times Liq_{i,t} \times SentH(L)_t + \beta_6 Lreturn_1M_{i,t} + \beta_7 Early_{i,t} + \beta_8 Late_{i,t} + \beta_9 Retvol_{i,t} + \beta_{10} Size_{i,t} + \beta_{11} BM_{i,t} + \beta_{12} Leverage_{i,t} + \beta_{13} GoodNews^2_{i,t} + \beta_{14} BadNews^2_{i,t} + \beta_{15} GoodNews_{i,t} \times MktPE_{i,t} + \beta_{16} BadNews_{i,t} \times MktPE_{i,t} + \varepsilon \quad (3)$$

$Liq_{i,t}$ represents the stock liquidity rank, and the other variables are as previously defined. Regression model (3) is estimated separately under optimistic and pessimistic sentiment conditions. It is expected that with increased stock liquidity, cognitive dissonance decreases, and investors in pessimistic (optimistic) sentiment conditions show a positive (negative) reaction to good (bad) earnings news. In other words, if the coefficient β_4 is positive and significant under pessimistic sentiment conditions and the coefficient β_5 is negative and significant under optimistic sentiment conditions, hypotheses four and five are not rejected.

According to hypotheses six and seven, financial reporting quality weakens the muted reaction of investors to good (bad) earnings news under pessimistic (optimistic) sentiment conditions. The regression model (4) is used to test these two hypotheses.

$$CAR_{i,t} = \beta_0 + \beta_1 GoodNews_{i,t} + \beta_2 BadNews_{i,t} + \beta_3 FRC_{i,t} + \beta_4 GoodNews_{i,t} \times FRC_{i,t} \times SentH(L)_t + \beta_5 BadNews_{i,t} \times FRC_{i,t} \times SentH(L)_t + \beta_6 Lreturn_1M_{i,t} + \beta_7 Early_{i,t} + \beta_8 Late_{i,t} + \beta_9 Retvol_{i,t} + \beta_{10} Size_{i,t} + \beta_{11} BM_{i,t} + \beta_{12} Leverage_{i,t} + \beta_{13} GoodNews^2_{i,t} + \beta_{14} BadNews^2_{i,t} + \beta_{15} GoodNews_{i,t} \times MktPE_{i,t} + \beta_{16} BadNews_{i,t} \times MktPE_{i,t} + \varepsilon \quad (4)$$

FRC represents the financial reporting quality rank, and the other variables are as previously defined. The regression model (4) is estimated separately under optimistic and pessimistic sentiment conditions. It is expected that with increased financial reporting quality, cognitive dissonance decreases, and investors in pessimistic (optimistic) sentiment conditions show a positive (negative) reaction to good (bad) earnings news. In other words, if the coefficient β_4 is positive and significant under pessimistic sentiment conditions and the coefficient β_5 is negative and significant under optimistic sentiment conditions, hypotheses six and seven are not rejected.

According to hypotheses eight and nine, earnings persistence weakens the muted reaction of investors to good (bad) earnings news under pessimistic (optimistic) sentiment conditions. The regression model (5) is used to test these two hypotheses.

$$CAR_{i,t} = \beta_0 + \beta_1 GoodNews_{i,t} + \beta_2 BadNews_{i,t} + \beta_3 Evol_{i,t} + \beta_4 GoodNews_{i,t} \times Evol_{i,t} \times SentH(L)_t + \beta_5 BadNews_{i,t} \times Evol_{i,t} \times SentH(L)_t + \beta_6 Lreturn_1M_{i,t} + \beta_7 Early_{i,t} + \beta_8 Late_{i,t} + \beta_9 Retvol_{i,t} + \beta_{10} Size_{i,t} + \beta_{11} BM_{i,t} + \beta_{12} Leverage_{i,t} + \beta_{13} GoodNews^2_{i,t} + \beta_{14} BadNews^2_{i,t} + \beta_{15} GoodNews_{i,t} \times MktPE_{i,t} + \beta_{16} BadNews_{i,t} \times MktPE_{i,t} + \varepsilon \quad (5)$$

Evol represents the earnings persistence rank, and the other variables are as previously defined. The regression model (5) is estimated separately under optimistic and pessimistic sentiment conditions. It is expected that with increased earnings persistence, cognitive dissonance decreases, and investors in pessimistic (optimistic) sentiment conditions show a positive (negative) reaction to good (bad) earnings news. In other words, if the coefficient β_4 is positive and significant under pessimistic sentiment conditions and the coefficient β_5 is negative and significant under optimistic sentiment conditions, hypotheses eight and nine are not rejected.

Research Variables

Dependent Variable: Cumulative Abnormal Return (CAR) in a five-day window $[-2, +2]$ centered on the quarterly earnings announcement date. Following the studies of Choi (2018) and Gyamfi-Yeboah et al. (2018), the cumulative abnormal return is calculated as the sum of abnormal returns in the five-day earnings announcement window, according to models (6), (7), and (8):

$$CAR_{i,t} = \sum_{-2}^{+2} AR_{it} \quad (6)$$

$$AR_{it} = R_{it} - R_{mt} \quad (7)$$

$$R_{mt} = \frac{I_{mt} - I_{m0}}{I_{m0}} \quad (8)$$

CAR: Cumulative Abnormal Return in the five-day earnings announcement window. AR is the abnormal return on day i , R_{it} is the daily return of company i , R_{mt} is the daily market return, I_{mt} is the market index on day t , and I_{m0} is the market index on the previous day ($t-1$).

Independent Variables:

GoodNews and BadNews, representing positive and negative unexpected earnings, respectively. If unexpected earnings are positive, GoodNews equals the absolute value of unexpected earnings (SUE); otherwise, it is zero. If unexpected earnings are negative, BadNews equals the absolute value of unexpected earnings (SUE); otherwise, it is zero. Unexpected earnings per share (SUE) is the difference between the actual earnings of a quarter and the actual earnings of the same quarter in the previous year. Following the studies of Bathke et al. (2019), Clement et al. (2019), and Livnat and Mendenhall (2006), unexpected earnings per share are calculated according to model (9):

$$SUE_{i,q} = \frac{E_{i,q} - E_{i,q-4}}{P_{i,q}} \quad (9)$$

$SUE_{i,q}$: Unexpected earnings of company i in quarter q , $E_{i,q}$: Quarterly earnings of company i in the current year, and $E_{i,q-4}$: Earnings of company i in the same quarter of the previous year, $P_{i,q}$: Stock price at the end of quarter q .

Moderating variables: The moderating variables include optimistic and pessimistic sentiments, stock liquidity, financial reporting quality, and earnings persistence, which are explained below in terms of their calculation methods.

a) Optimistic and pessimistic sentiments: First, the method of calculating the sentiment index and then the classification of optimistic and pessimistic periods are described.

Construction of the sentiment measure: To calculate the sentiment variable, considering the conditions governing the Iranian capital market, the following indices were used: the number of initial public offerings (IPOs) (Baker & Wurgler, 2006; Ling et al., 2010; Ferreira et al., 2021), the average return of the first week of IPOs (Baker & Wurgler, 2006; Ferreira et al., 2021), the ratio of the number of positive symbols to the total number of positive and negative symbols (Tohidi, 2020), the volume of real transactions to the total volume (Tahernezhad et al., 2022; Tohidi, 2020), average monthly net real purchase volume, and average monthly net real purchase value. Before calculating the sentiment variable using Principal Component Analysis (PCA), and following Tohidi (2020), each of the six indices used for calculating sentiment was purified from the effects of macroeconomic variables such as Consumer Price Index (CPI), exchange rate (USD), gold price per ounce, and new Bahar Azadi coin price. This was done by estimating separate regression models for each of the six indices against the four macro variables. The residuals of these models were considered as the purified values of the indices, which are unaffected by macroeconomic variables. Finally, the purified values of the six indices were combined into a single composite index through PCA. In this study, the sentiment variable is measured at the market level based on the indices used for its calculation. All indices used for the sentiment variable and the macroeconomic variables used to purify the irrelevant information effects are measured monthly. Therefore, the composite sentiment variable is also calculated monthly over 111 months during the study period.

Determining optimistic and pessimistic periods: Following Antoniou et al. (2013), to determine the market sentiment status around a quarterly earnings announcement (i.e., identifying market optimism or pessimism), the weighted average sentiment index for the three months before month t , in which the earnings are announced, is calculated as described in equation (10):

$$WSent_t = 3/6 \times Sent_{t-1} + 2/6 \times Sent_{t-2} + 1/6 \times Sent_{t-3} \quad (10)$$

$WSent_t$: The weighted average sentiment for the three months before the earnings announcement month. If $WSent_t$ in month $\{t-1\}$ is in the top 30% (bottom 30%) of the entire sample, then month t is classified as having optimistic (pessimistic) sentiment, and the remaining periods are classified as having mild sentiment. Subsequently, to incorporate market optimistic and pessimistic sentiments into the research models, two dummy variables SENTH and SENTL are used. SENTH is a dummy variable that takes the value one during optimistic market periods and zero otherwise. Similarly, SENTL is a dummy variable that takes the value one during pessimistic market periods and zero otherwise.

b) Stock Liquidity (Liq): This variable is calculated based on the stock turnover measure of Pastor and Stambaugh (2003). The volume of traded shares divided by the number of shares outstanding in a given period (which is quarterly in this study) indicates the stock turnover index, which is positively related to liquidity. First, the sample companies are ranked from zero to four based on stock liquidity, where companies with a rank of zero have the lowest liquidity and companies with a rank of four have the highest liquidity.

c) Financial Reporting Credibility (FRC): To measure this variable, the information transparency metric (Tran) is used. Following the model of discretionary accruals by Kothari et al. (2005), the transparency of company information is calculated as described in equation (11):

$$TA_{i,t} = \alpha_0 + \alpha_1 \Delta SALES_{i,t} + \alpha_2 PPE_{i,t} + \alpha_3 ROA_{i,t} + \varepsilon_{i,t} \quad (11)$$

$TA_{i,t}$ is the total accruals of company i in quarter t , which is scaled by dividing by the beginning total assets and calculated using equation (12):

$$TA_{i,t} = (\Delta CA_{i,t} - \Delta CASH_{i,t}) - (\Delta DCL_{i,t} - \Delta STD_{i,t}) - DEP_{i,t} \quad (12)$$

ΔCA : Change in current assets in the current quarter compared to the previous quarter.

$\Delta CASH$: Change in cash in the current quarter compared to the previous quarter.

ΔDCL : Change in liabilities in the current quarter compared to the previous quarter.

ΔSTD: Change in the current portion of long-term liabilities in the current quarter compared to the previous quarter. DEP: Depreciation expense in the current quarter.

ΔSALES_{*i,t*}: Change in sales of company *i* in quarter *t*, scaled by dividing by beginning total assets. PPE_{*i,t*}: Net property, plant, and equipment of company *i* at the end of quarter *t*, scaled by dividing by beginning total assets. ROA_{*i,t*}: Return on assets of company *i* in quarter *t*, calculated by dividing net income by total assets. $\varepsilon_{i,t}$: Model residual (Kothari et al., 2005).

Regression equation (11) is estimated cross-sectionally and quarterly, and the residual represents discretionary accruals. To calculate the company's information transparency each quarter, the negative of the average absolute discretionary accruals over the previous twelve quarters is used.

d) Profit Persistence: To measure profit persistence, following Perotti and Wagenhofer (2014), current quarter net income is regressed on prior quarter net income as described in regression equation (13):

$$\text{Earnings}_{i,t} = \alpha + \beta \text{Earnings}_{i,t-1} + \varepsilon_{i,t} \quad (13)$$

Earnings_{*i,t*}: Quarterly net income. $\varepsilon_{i,t}$: Model residual.

After estimating equation (13), the coefficient β is considered as the earnings persistence coefficient. Since the earnings persistence coefficient must be calculated separately for each company in each quarter, equation (13) is estimated as a time series in a rolling 3-year period (12 quarters) (i.e., from *t* to *t*-12) separately for each company in each quarter.

Control Variables:

Lreturn_1M: Stock return of the company in the month before the earnings announcement. Early: A dummy variable that equals one if the earnings announcement date of a company is in the first quintile within a given fiscal quarter, and zero otherwise. To calculate this variable, companies in each quarter are ranked based on the earnings announcement date from earliest to latest and then divided into quintiles. If the quarterly earnings announcement date of company *i* falls in the first quintile, the Early variable takes the value of one; otherwise, zero. Late: A dummy variable that equals one if the earnings announcement date of a company is in the last quintile within a given fiscal quarter, and zero otherwise. The quintile method is the same as for the Early variable (Savor & Wilson, 2016). Retvol: Standard deviation of monthly stock returns over the 12 months before the earnings announcement. Size: Company size, defined as the natural logarithm of the market value of equity at the end of the month before the earnings announcement. BM: Book-to-market ratio at the end of each quarter. Leverage: Financial leverage, calculated as total liabilities divided by total assets at the end of each quarter. GoodNews²: Square of GoodNews. BadNews²: Square of BadNews (Freeman & Tse, 1992). MktPE: Price-to-earnings ratio, defined as the relative price-to-earnings ratio. To calculate this variable, the price-to-earnings ratio (PE) in the month before the earnings announcement is divided by the average PE over the prior 12 months (Li et al., 2023).

Research Findings

Table (1) presents descriptive statistics of the main variables of the study.

Table 1. Descriptive statistics of research variables

Variable Name	Symbol	Mean	Median	Max	Min	Std. Dev.
Cumulative Abnormal Return	CAR	-0.600	-0.900	0.519	-0.975	0.074
Good Earnings News	GOODNEWS	0.017	0.100	1.042	0.000	0.049
Bad Earnings News	BADNEWS	0.024	0.000	2.042	0.000	0.089
Book-to-Market Ratio	BM	0.323	0.259	1.726	-1.538	0.276
Financial Leverage	LEVERAGE	0.589	0.606	1.520	0.013	0.211
Stock Return One Month Before Earnings Announcement	LRETURN1M	0.022	-0.500	2.104	-1.000	0.220
Price-to-Earnings Ratio	MKTPE	1.153	0.948	332.880	-260.454	8.432
Monthly Return Volatility	RETVOL	0.185	0.164	0.642	0.000	0.093
Firm Size	SIZE	12.647	12.606	15.439	0.753	0.753

Source: Research findings

The mean is a central measure that represents the balance point and center of gravity of a distribution. For example, according to Table (1), the mean of the dependent variable (Cumulative Abnormal Return - CAR) is -0.006, indicating that the data for this variable are mostly concentrated around this point. Additionally, this value for the independent variables Good News and Bad News is 0.017 and 0.024, respectively. One of the dispersion measures is the standard deviation, which shows the extent of data spread around the mean. The standard deviation for the dependent variable is 0.074, indicating that the average dispersion of CAR values around the mean is 0.074. The maximum and minimum values of each variable can also reflect the degree of data dispersion to some extent. The maximum value for the CAR variable is 0.519.

Some research variables were not directly used in the hypothesis testing models but were instead utilized for ranking purposes; descriptive statistics for these variables are presented in Table (2).

Table 2. Descriptive statistics of the variables used for ranking

Variable Name	Symbol	Mean	Median	Max	Min	Std. Dev.
Stock Liquidity	LIQ	0.151	0.074	2.183	0.000	0.003
Firm Size	RANKSIZE	12.417	12.318	15.439	10.305	0.011
Asset Tangibility	TANG	0.996	0.998	1.000	0.931	0.000
Net Income Volatility	FURANK	0.087	0.071	1.753	0.001	0.001
Financial Reporting Credibility	FRC	0.000	-0.005	7.460	-1.457	0.002
Earnings Persistence	PERSIS	-0.295	-0.318	2.627	-1.092	0.003
Market Uncertainty	MU	0.037	0.008	2.176	0.000	0.003

Source: Research findings

Hypothesis Testing

Before estimating the research models, the appropriate estimation model was determined based on the Chow and Hausman tests. Since the p-values of both tests were below the 5% significance level, the models were estimated using panel data with fixed effects. To detect heteroscedasticity and autocorrelation, the LR test and Wooldridge test were employed, respectively. The results indicated the presence of heteroscedasticity and first-order autocorrelation; therefore, to mitigate their effects, the GLS method and White's correction were applied. Additionally, multicollinearity among explanatory variables was examined using the Variance Inflation Factor (VIF), and the VIF values for all variables in the research models were below 10, indicating no multicollinearity problem.

The Results of Testing the First, Second, and Third Hypotheses

A summary of the results from estimating regression models (1) and (2) is presented in Table (3).

Table 3. Results of testing the first, second, and third hypotheses

Variable	Model 1: Full Market			Model 2: Optimistic Period			Model 3: Pessimistic Period		
	Coefficient	t-Statistic	p-Value	Coefficient	t-Statistic	p-Value	Coefficient	t-Statistic	p-Value
GOODNEWS	0.086	2.915	0.004	0.065	1.691	0.091	0.172	3.297	0.001
BADNEWS	-0.049	-2.554	0.010	-0.028	-1.291	0.197	-0.034	-1.591	0.112
GOODNEWS × Optimistic Sentiment	-	-	-	0.085	2.314	0.021	-	-	-
BADNEWS × Optimistic Sentiment	-	-	-	0.014	1.012	0.311	-	-	-
GOODNEWS × Pessimistic Sentiment	-	-	-	-	-	-	-0.061	-1.554	0.120
BADNEWS × Pessimistic Sentiment	-	-	-	-	-	-	-0.032	-2.032	0.042
LRETURN1M	-0.015	-2.975	0.003	-0.002	-0.303	0.762	-0.007	-1.223	0.221
EARLY	0.020	3.297	0.001	0.015	2.118	0.034	0.022	2.975	0.003
LATE	-0.005	-1.238	0.216	-0.004	-1.060	0.289	-0.010	-2.532	0.011
RETVOL	-0.031	-2.673	0.007	-0.045	-3.674	0.000	-0.040	-2.960	0.003
SIZE	-0.008	-3.272	0.001	-0.005	-2.592	0.010	-0.010	-3.253	0.001
Book-to-Market Ratio	-0.030	-4.918	0.000	-0.020	-4.171	0.000	-0.033	-4.828	0.000
LEVERAGE	-0.033	-3.354	0.001	-0.017	-3.092	0.002	-0.032	-2.953	0.003
GoodNews ²	-0.027	-3.924	0.000	-0.021	-2.433	0.015	-0.151	-1.367	0.172
BadNews ²	0.018	1.766	0.077	0.008	0.725	0.468	0.025	2.241	0.025
GOODNEWS × MKTPE	0.005	0.361	0.717	0.007	0.418	0.676	0.022	1.256	0.209
BADNEWS × MKTPE	0.009	0.808	0.419	0.006	0.437	0.662	0.014	1.285	0.199
Intercept	0.132	3.603	0.000	0.078	3.108	0.002	0.153	3.536	0.000

Adjusted R-squared	0/018	0/122	0/016
F-statistic	1/598(0/000)	13/309(0/000)	1/515(0/000)

Source: Research findings

The results of testing the first hypothesis show that the significance level for the Good News variable is 0.000, and for the Bad News variable, it is 0.026; both are below the 5% error level and are statistically significant. Moreover, the coefficients of these variables are, as expected, positive for Good News and negative for Bad News, indicating an asymmetric reaction of investors to this news. Therefore, the first hypothesis of the study is not rejected at the 95% confidence level. Based on the model estimation during periods of optimistic market sentiment, the significance level of the coefficient for Good News is 0.032, which is below the 5% error level and indicates its significance. Additionally, this coefficient is positive. However, the significance level of the coefficient for Bad News in the same period is 0.293, showing that this variable is not statistically significant and investors do not react to bad news. This lack of reaction under optimistic conditions indicates investor silence in response to bad news. Hence, the second hypothesis is also not rejected at the 95% confidence level. Regarding the third hypothesis, findings indicate that the coefficient for Bad News under pessimistic sentiment is negative and significant (significance level 0.045), whereas the coefficient for Good News is not significant with a significance level of 0.158. This suggests that investors do not react to good news during pessimistic conditions, which may be due to cognitive dissonance and investor silence in response to good earnings news under pessimistic sentiment. Therefore, the third hypothesis of the study is also not rejected at the 95% confidence level.

The Results of Testing the Fourth and Fifth Hypotheses

A summary of the results from estimating the regression model (3) is presented in [Table \(4\)](#).

Table 4. Results of testing the fourth and fifth hypotheses

Variable	Hypothesis 4: Pessimistic Period			Hypothesis 5: Optimistic Period		
	Coefficient	t-Statistic	p-Value	Coefficient	t-Statistic	p-Value
GOODNEWS	0.186	5.142	0.000	0.145	3.406	0.001
BADNEWS	-0.040	-1.446	0.148	-0.031	-0.993	0.321
Liquidity Rank	0.002	1.561	0.119	0.002	0.811	0.418
GOODNEWS × LIQ × Optimistic Sentiment	-	-	-	0.006	0.399	0.690
BADNEWS × LIQ × Optimistic Sentiment	-	-	-	-0.008	-0.759	0.448
GOODNEWS × LIQ × Pessimistic Sentiment	-0.020	-1.797	0.072	-	-	-
BADNEWS × LIQ × Pessimistic Sentiment	-0.006	-0.701	0.483	-	-	-
LRETURN1M	-0.016	-2.776	0.005	-0.007	-1.192	0.234
EARLY	0.019	3.085	0.002	0.022	3.011	0.003
LATE	-0.006	-1.425	0.154	-0.009	-2.341	0.019
RETVOL	-0.033	-2.798	0.005	-0.042	-3.052	0.002
SIZE	-0.008	-3.149	0.002	-0.011	-3.458	0.001
Book-to-Market Ratio	-0.028	-5.571	0.000	-0.032	-4.636	0.000
LEVERAGE	-0.029	-3.014	0.003	-0.031	-2.894	0.004
GOODNEWS ²	-0.159	-3.335	0.000	-0.159	-4.172	0.000
BADNEWS ²	0.031	0.582	0.409	0.029	0.638	0.523
GOODNEWS×MKTPE	0.005	-3.628	0.738	0.023	1.415	0.157
BADNEWS×MKTPE	0.009	0.826	0.561	0.011	0.758	0.448
Intercept	0.121	3.291	0.001	0.158	3.673	0.000
Adjusted R-squared	0/021			0/016		
F-statistic	0/000			0/000		

Source: Research findings

The fourth hypothesis of the study states that an increase in stock liquidity weakens investors' silent reaction to good earnings news under pessimistic sentiment conditions. According to this hypothesis, it was expected that the coefficient of the interaction variable GOODNEWS*LIQ under pessimistic conditions would be positive and significant. According to the results in [Table \(4\)](#), the significance level of this coefficient is 0.072, which is significant at the 90% confidence level; however, the sign of the coefficient is negative, contrary to expectations. Therefore, the fourth hypothesis is rejected at the 90% confidence level. Since the significance level of this coefficient is significant at 90%, it can be concluded that when pessimistic sentiment exists in the market, even the release of good earnings news leads to

a negative reaction from investors. In other words, with increased liquidity under pessimistic sentiment, cognitive dissonance does not decrease, and investors do not respond positively to good earnings news during pessimistic conditions.

Furthermore, the fifth hypothesis states that an increase in stock liquidity weakens investors' silent reaction to bad earnings news under optimistic sentiment conditions. Based on this hypothesis, it was expected that the coefficient of the interaction variable $BADNEWS * LIQ$ under optimistic conditions would be negative and significant. According to the results in Table (4), the coefficient of this variable is 0.448, which is not negative and not significant at the 5% error level. Consequently, the fifth hypothesis is rejected at the 95% confidence level. In other words, contrary to expectations, with increased liquidity, cognitive dissonance does not decrease, and investors under optimistic sentiment conditions did not show a significant reaction to bad earnings news.

The Results of Testing the Sixth and Seventh Hypotheses

A summary of the results from estimating the regression model (4) is presented in Table (5).

Table 5. Results of testing the sixth and seventh hypotheses

Variable	Hypothesis 6: Pessimistic Period			Hypothesis 7: Optimistic Period		
	Coefficient	t-Statistic	p-Value	Coefficient	t-Statistic	p-Value
GOODNEWS	0.195	4.238	0.000	0.155	3.527	0.000
BADNEWS	-0.011	-0.469	0.639	-0.005	-0.191	0.848
Financial Reporting Credibility (FRC)	0.002	1.422	0.155	0.003	2.239	0.025
GOODNEWS×FRC× Optimistic Sentiment	-	-	-	-0.006	-0.302	0.763
BADNEWS×FRC× Optimistic Sentiment	-	-	-	-0.019	-1.992	0.046
GOODNEWS×FRC× Pessimistic Sentiment	-0.028	-2.584	0.009	-	-	-
BADNEWS×FRC× Pessimistic Sentiment	-0.003	-0.239	0.811	-	-	-
LRETURN1M	0.000	0.060	0.952	-0.008	-1.326	0.185
EARLY	0.018	2.339	0.019	0.023	3.109	0.002
LATE	-0.006	-1.545	0.122	-0.009	-2.415	0.016
RETVOL	-0.043	-2.789	0.005	-0.042	-3.098	0.002
SIZE	-0.041	-5.529	0.000	-0.008	-2.609	0.009
BM	-0.031	-4.385	0.000	-0.032	-4.747	0.000
LEVERAGE	-0.041	-3.608	0.000	-0.032	-2.964	0.003
GOODNEWS ²	-0.175	-4.050	0.000	-0.163	-3.849	0.000
BADNEWS ²	0.001	0.067	0.947	-0.013	-0.617	0.537
GOODNEWS×MKTPE	0.013	0.632	0.528	0.024	1.409	0.159
BADNEWS×MKTPE	0.006	0.358	0.720	0.011	0.853	0.393
Intercept (C)	0.542	5.619	0.000	0.119	2.729	0.006
Adjusted R-squared	0.137			0.016		
F-statistic	0.000			0.000		

Source: Research findings

Hypothesis Six states that financial reporting credibility weakens investors' silent reaction to good earnings news under pessimistic market sentiment. According to this hypothesis, in pessimistic conditions, the coefficient of the variable $GOODNEWS * FRC$ was expected to be positive and significant. According to the results shown in Table (5), the significance level of this coefficient is 0.009, which is significant at the 95% confidence level, but the sign of the coefficient is negative, contrary to expectations. Therefore, hypothesis six is rejected at the 95% confidence level. In other words, contrary to expectations, with increased financial reporting credibility in pessimistic sentiment conditions, cognitive dissonance is not reduced, and investors do not show a positive reaction to good earnings news.

Furthermore, hypothesis seven states that financial reporting credibility weakens investors' silent reaction to bad earnings news under optimistic market sentiment. Accordingly, in optimistic conditions, the coefficient of the variable $BADNEWS * FRC$ was expected to be negative and significant. According to the results in Table (5), the significance level of this coefficient is 0.046, and its sign is negative. Therefore, hypothesis seven is not rejected at the 95% confidence level. In other words, as expected, with increased financial reporting credibility in optimistic sentiment conditions, cognitive dissonance is reduced, and investors show a negative reaction to bad earnings news.

The Results of Testing the Eighth and Ninth Hypotheses

A summary of the results from estimating the regression model (4) is presented in Table (6).

Hypothesis Eight states that earnings persistence weakens investors' silent reaction to good earnings news under pessimistic market sentiment. According to this hypothesis, in pessimistic conditions, the coefficient of the variable $GOODNEWS * PERSIS$ was expected to be positive and significant. According to the results in Table (6), the significance level of this coefficient is 0.037, which is significant at the 95% confidence level, but the sign of the coefficient is negative, contrary to expectations. Therefore, hypothesis eight is rejected at the 95% confidence level. In other words, contrary to expectations, with increased earnings persistence under pessimistic sentiment conditions, cognitive dissonance is not reduced, and investors do not show a positive reaction to good earnings news.

Furthermore, hypothesis nine states that earnings persistence weakens investors' silent reaction to bad earnings news under optimistic market sentiment. Accordingly, in optimistic conditions, the coefficient of the variable $BADNEWS * PERSIS$ was expected to be negative and significant. According to the results in Table (6), the coefficient of this variable is 0.584, which is neither negative nor significant at the 5% significance level. Consequently, hypothesis nine is rejected at the 95% confidence level. In other words, contrary to expectations, with

increased earnings persistence, cognitive dissonance is not reduced, and investors under pessimistic (optimistic) sentiment conditions do not show positive (negative) reactions to good (bad) earnings news.

Table 6. Results of testing the eighth and ninth hypotheses

Variable	Hypothesis 8: Pessimistic Period			Hypothesis 9: Optimistic Period		
	Coefficient	t-Statistic	p-Value	Coefficient	t-Statistic	p-Value
GOODNEWS	0.220	4.717	0.000	0.148	3.523	0.000
BADNEWS	-0.010	-0.324	0.746	-0.029	-1.075	0.283
PERSISTENCE	-0.001	-1.203	0.229	-0.001	-0.672	0.502
GOODNEWS×PERSISTENCE× Optimistic Sentiment	-	-	-	0.015	0.994	0.320
BADNEWS×PERSISTENCE× Optimistic Sentiment	-	-	-	-0.005	-0.548	0.584
GOODNEWS×PERSISTENCE× Pessimistic Sentiment	-0.027	-2.082	0.037	-	-	-
BADNEWS×PERSISTENCE× Pessimistic Sentiment	-0.003	-0.329	0.742	-	-	-
LRETURN1M	-0.002	-0.388	0.698	-0.007	-1.107	0.269
EARLY	0.014	2.464	0.014	0.022	3.013	0.003
LATE	-0.005	-1.057	0.291	-0.009	-2.335	0.019
RETVOL	-0.047	-3.211	0.001	-0.039	-2.866	0.004
SIZE	-0.005	-1.744	0.081	-0.010	-3.327	0.001
BM	-0.020	-3.686	0.000	-0.033	-4.811	0.000
LEVERAGE	-0.018	-3.415	0.001	-0.032	-2.964	0.003
GOODNEWS ²	-0.228	-4.103	0.000	-0.173	-3.937	0.000
BADNEWS ²	0.006	0.147	0.883	0.019	0.699	0.485
GOODNEWS×MKTPE	0.013	1.176	0.239	0.020	1.299	0.194
BADNEWS×MKTPE	0.008	0.617	0.538	0.012	0.834	0.404
Intercept (C)	0.079	2.308	0.021	0.157	3.679	0.000
Adjusted R-squared	0.125			0.015		
F-statistic	0.000			0.000		

Source: Research findings

Discussion and Conclusion

This study examined the impact of cognitive dissonance bias on investors' reactions to good and bad earnings news. The results of testing the first hypothesis, consistent with theoretical foundations, showed that investors react positively to good earnings news and negatively to bad earnings news. According to cognitive dissonance bias, investors tend to ignore earnings news that contradicts their emotional state. Consistent with the results of hypotheses two and three, under optimistic sentiment conditions, investors react positively to good earnings news and exhibit a silent reaction to bad news, while under pessimistic sentiment conditions, they react negatively to bad earnings news and exhibit a silent reaction to good news. These results confirm the presence of cognitive dissonance in different market sentiments (optimistic and pessimistic) in the Tehran Stock Exchange. These findings align with the research of Li et al. (2023).

According to the results of hypotheses four and five, with an increase (decrease) in liquidity under pessimistic (optimistic) sentiment conditions, cognitive dissonance did not diminish, and investors did not show positive (negative) reactions to good (bad) earnings news under pessimistic (optimistic) sentiment. The findings of hypotheses four and five are consistent with the results of Li et al. (2023) and Ho and Moskowitz (2005). To analyze why the increase in stock liquidity did not weaken the existing cognitive dissonance in the Tehran Stock Exchange, several points can be noted. Cognitive dissonance usually relates to the conflict between beliefs, emotions, and individual behaviors that can interfere with the decision-making process. This phenomenon primarily relates to the psychological and behavioral characteristics of individuals rather than market features or stock liquidity. Therefore, even if stock liquidity increases, psychological and behavioral factors of investors may be strong enough not to affect cognitive dissonance. In other words, even if the market becomes more liquid, investors may still be influenced by factors such as fear, greed, or behavioral biases that cause cognitive dissonance. Additionally, trading volume might not be sufficiently high to significantly reduce cognitive dissonance. Moreover, other factors such as lack of

information transparency, political and economic influences, or herd behavior in the Iranian market may affect cognitive dissonance. Given these analyses, the findings of these two hypotheses indicate that cognitive dissonance is more influenced by behavioral and psychological factors than market characteristics, and even with increased liquidity, these factors continue to significantly impact investors' decisions.

Based on the findings of hypothesis six, contrary to expectations, it was observed that with the increase in the credibility of financial reporting under pessimistic sentiment conditions, cognitive dissonance did not decrease and investors did not react positively to good earnings news. These findings are inconsistent with the research results of Li et al. (2023), Peng et al. (2020), and D'Augusta and Prince (2024). Possible reasons for rejecting the hypothesis include that, according to the literature on sentiment, individuals tend to be more critical of available information when they are pessimistic, while when they are optimistic, they are more likely to receive information realistically. As a result, investors may set higher psychological thresholds for "good news" during pessimistic sentiments. Investors' expectations for earnings continuation during pessimistic periods are lower. In other words, investors are more critical of unexpected positive earnings continuation in pessimistic conditions and pay less attention to good earnings news. The common belief is that bear markets generally last longer than bull markets. This may relate to the stronger influence of prevailing pessimistic sentiment in the market. Therefore, according to the results obtained from hypothesis six, under pessimistic sentiment conditions, contrary to expectations, with increased financial reporting credibility, cognitive dissonance did not decrease, and investors showed negative reactions to good earnings news as well.

According to the results of hypothesis seven, with the improvement of financial reporting credibility, the effect of cognitive dissonance under optimistic conditions has decreased. These findings are consistent with the research results of Li et al. (2023), Peng et al. (2020), and D'Augusta and Prince (2024). Thus, when financial reports are more accurate, transparent, and credible, investors and analysts have greater trust in the available information, reducing the likelihood of erroneous decisions. In other words, when accurate and transparent information is accessible, individuals are less influenced by their assumptions or cognitive errors and make more rational and informed decisions. Furthermore, in environments where accurate and reliable financial information exists, individuals can more easily make better decisions because ambiguities and uncertainties decrease. Consequently, cognitive dissonances arising from misinterpretation of information or psychological effects such as excessive optimism or pessimism become less pronounced. With increased financial reporting credibility, cognitive errors such as the "limited information effect" or "positive feedback effect" become less influential because individuals can readily access valid and unambiguous data. Overall, the findings of this hypothesis indicate that when financial information becomes more accurate and reliable, investors' cognitive errors and distortions reduce, and decisions come closer to economic realities. This helps reduce cognitive dissonance and acts as a mitigating factor.

The findings of hypotheses eight and nine indicate that increased earnings persistence has not been able to mitigate the existing cognitive dissonance in the Tehran Stock Exchange. These findings are inconsistent with the results of Li et al. (2023) and Brown et al. (2012). Some possible reasons can be analyzed as follows: Cognitive dissonance refers to psychological conflicts and tensions caused by two contradictory beliefs or behaviors. In financial markets, this phenomenon manifests as incorrect decisions due to the conflict between available information and individual investors' expectations. Earnings persistence may not affect these psychological conflicts because investors, for various reasons such as emotional behaviors, biases, or cognitive biases (e.g., confirmation bias), still tend to make decisions based on their prior beliefs even when new data show those decisions are incorrect. Moreover, earnings persistence refers to companies' ability to maintain their earnings over time. If investors do not fully understand the factors affecting earnings persistence or their analyses are superficial, they may still be influenced by their prior earnings expectations. In other words, even if a company has persistent earnings, investors may not process new information correctly and thus experience cognitive dissonance. Additionally, cognitive dissonance may be influenced by macroeconomic conditions. In exchanges affected by severe economic fluctuations, sanctions, or political uncertainties, even persistent earnings cannot eliminate investors' existing doubts. Under such circumstances, external and unpredictable factors such as economic crises, currency fluctuations, or changes in economic policies may impact investors' decisions. Some investors may doubt earnings persistence in emerging markets, especially if there is a history of severe fluctuations in company performance. Therefore, increased earnings persistence may not fully reduce the effect of cognitive dissonance because investors still worry about unpredictable risks and potential instabilities in the future. Overall, the obtained results may stem from a combination of factors including cognitive biases, unclear informational conditions, transparency problems in emerging markets, and macroeconomic variable impacts. Accordingly, more complex psychological and behavioral models may be required to analyze cognitive dissonance in the Tehran Stock Exchange.

Research Suggestions

Based on the findings of hypotheses one, two, and three regarding investors' asymmetric reactions to earnings news under optimistic and pessimistic conditions, it is recommended that investors increase their awareness of cognitive biases to make more rational decisions. Company managers can also reduce the negative effects of market sentiment by enhancing the transparency and quality of financial reports. Additionally, regulatory bodies and financial analysts should contribute to improving decision-making and market efficiency by providing behavioral training and analyses based on the psychological conditions of the market.

According to the findings of hypotheses four and five, which showed that an increase in liquidity alone cannot reduce investors' cognitive dissonance and that this phenomenon likely stems more from psychological and behavioral factors than market characteristics, it is recommended that regulators and capital market policymakers, in addition to improving liquidity, focus more on enhancing financial literacy, investment behavior education, and emotion management in the market. This can help reduce behavioral biases and promote more rational decision-making among investors.

Furthermore, based on the results of hypotheses six and seven, it is suggested that investors consider the quality, accuracy, and credibility of informational signals from companies, such as earnings announcements, during their evaluations. Information lacking adequate precision and quality may indicate a lack of financial reporting credibility in companies and contribute to increased cognitive dissonance among investors. Therefore, investing in such companies should be approached with greater caution.

Finally, according to the findings of hypotheses eight and nine, although increased earnings persistence did not reduce investors' cognitive dissonance, it is recommended that capital market policymakers, besides focusing on financial indicators like earnings persistence,

implement complementary measures to improve information transparency, provide fundamental analysis training, and reduce cognitive biases among investors.

For future research, it is recommended to apply cognitive dissonance theory to explain stock return reactions following other types of news, such as stock issuance announcements, initial public offerings, merger announcements, and the enforcement of new laws or standards. Additionally, the impact of macroeconomic policy uncertainty on cognitive dissonance should be investigated.

Research Limitations

This study, as a process aimed at solving the research problem, faced some limitations. For example, the unavailability of daily price and return data for some companies led to their exclusion from the sample. Moreover, the investigation of the roots of cognitive dissonance was conducted through variables such as liquidity, financial reporting credibility, and earnings persistence, which may not cover all psychological dimensions. Specific characteristics of the Iranian capital market, such as economic volatility, sanctions, inflation, and lack of information transparency, limit the generalizability of the results. Additionally, differences in investors' individual characteristics and data time constraints may affect the interpretation of findings. Therefore, generalizing the results to other markets or periods requires caution.

References

- Ali, D. F., Sayal, A., Suri, P., Chauhan, M. S. S., & Ahmad, V. (2024). Decoding investor sentiments in the Indian Stock Market: A structural equation modelling approach. *F1000Research*, 13, 1378. <http://dx.doi.org/10.12688/f1000research.156635.2>
- Amihud, Y., & Mendelson, H. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics*, 17(2), 223-249. [https://doi.org/10.1016/0304-405X\(86\)90065-6](https://doi.org/10.1016/0304-405X(86)90065-6)
- Antonioni, C., Doukas, J. A., & Subrahmanyam, A. (2013). Cognitive dissonance, sentiment, and momentum. *Journal of Financial and Quantitative Analysis*, 48(1), 245-275. <https://doi.org/10.1017/S0022109012000592>
- Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, 61(4), 1645-1680. <https://doi.org/10.1111/j.1540-6261.2006.00885.x>
- Bathke, A., Mason, T., & Morton, R. (2019). Investor overreaction to earnings surprises & post-earnings-announcement reversals. *Journal of Contemporary Accounting Research*, 36(4), 2069-2092. <https://doi.org/10.1111/1911-3846.12491>
- Brown, N. C., Christensen, T. E., & Elliot, W. B. (2012). The timing of quarterly 'pro forma' earnings announcements. *Journal of Business Finance and Accounting*, 39(3-4), 315-359. <https://doi.org/j.1468-5957.2012.02281.x>
- Chang, T. Y., Solomon, D. H., & Westerfield, M. M. (2016). Looking for someone to blame: delegation, cognitive dissonance, and the disposition effect. *Journal of Finance*, 71(1), 267-302. <https://doi.org/10.2139/ssrn.2255674>
- Choi, H. (2018). A tale of two uncertainties. *Journal of Banking & Finance*, 92, 81-99. <https://doi.org/10.1016/j.jbankfin.2018.04.007>
- Chordia, T., Roll, R., & Subrahmanyam, A. (2001). Market liquidity and trading activity. *The Journal of Finance*, 56(2), 501-530. <https://doi.org/10.1111/0022-1082.00335>
- Clement, M., Lee, J., & Yong, K. (2019). A new perspective on post-earnings announcement drift: Using a relative drift measure. *Journal of Business Finance & Accounting*, 46(9-10), 1123-1143. <https://doi.org/10.1111/jbfa.12401>
- D'Augusta, C., & Prenceipe, A. (2024). Accruals quality, shocks to macro-uncertainty, and investor response to earnings news. *European Accounting Review*, 33(3), 1051-1074. <https://doi.org/10.1080/09638180.2022.2141288>
- Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, 50(2-3), 344-401. <https://doi.org/10.1016/j.jacceco.2010.09.001>
- Di Tella, R., Perez-Truglia, R., Babino, A., & Sigman, M. (2015). Conveniently upset: Avoiding altruism by distorting beliefs about others' altruism. *American Economic Review*, 105(11), 3416-3442. <https://doi.org/10.1257/aer.2014.1409>
- Eyshi Ravandi, M., Moeinaddin, M., Taftiyan, A., & Rostami Bashmani, M. (2024). Investigating the impact of investor sentiment and liquidity on stock returns of the Iranian Stock Exchange. *Dynamic Management and Business Analysis*, 3(1), 40-52. <http://dx.doi.org/10.61838/dmbaj.3.1.3>
- Fang, V. W., Noe, T. H., & Tice, S. (2009). Stock market liquidity and firm value. *Journal of Financial Economics*, 94(1), 150-169. <https://doi.org/10.1016/j.jfineco.2008.08.007>
- Ferreira, T. S., Machado, M. A., & Silva, P. Z. (2021). Asymmetric impact of investor sentiment on Brazilian stock market volatility. *RAM. Revista de Administração Mackenzie*, 22, eRAMR210032. <https://doi.org/10.1590/1678-6971/eRAMF210208>
- Festinger, L. (1957). A theory of cognitive dissonance. In *The blackwell encyclopedia of sociology. Chapter: Cognitive dissonance theory*. Publisher: John Wiley & Sons/Editors: George Ritzer. <http://dx.doi.org/10.1002/9781405165518.wbeosc058.pub2>
- Firth, M., Wang, K., & Wong, S. M. (2015). Corporate transparency and the impact of investor sentiment on stock prices. *Management Science*, 61(7), 1630-1647. <https://doi.org/10.1287/mnsc.2014.1911>
- Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2004). Costs of equity and earnings attributes. *The Accounting Review*, 79(4), 967-1010. <https://doi.org/10.2308/accr.2004.79.4.967>
- Freeman, R. N., & Tse, S. Y. (1992). A nonlinear model of security price responses to unexpected earnings. *Journal of Accounting research*, 30(2), 185-209. <http://hdl.handle.net/10.2307/2491123>

- Gyamfi-Yeboah, F., David, C. L., & Naranjo, A. (2012). Information, uncertainty, and behavioral effects: evidence from abnormal returns around real estate investment trust earnings announcements. *Journal of International Money and Finance*, 31, 1930-1952. <https://doi.org/10.1016/j.jimonfin.2012.05.013>
- Haghi, S., & Allahyari, A. (2022). Investigating the causal relationship between investor sentiments and excess returns of companies listed on the Tehran Stock Exchange. *Scientific Journal of New Research Approaches in Management and Accounting*, 6(22), 332-351. <https://doi.org/10.22059/acctgrev.2024.375900.1008946>
- Hajian Nejad, A., Amiri, H., & Khoramkahi, A. (2022). Analyzing the effects of investors' sentiments on the reaction to the profit news of companies listed on the Tehran Stock Exchange. *Financial Accounting Research*, 14(1), 1-20. <https://doi.org/10.22108/far.2022.132213.1852>
- Harmon-Jones, E., & Mills, J. (2019). An introduction to cognitive dissonance theory and an overview of current perspectives on the theory. In E. Harmon-Jones (Ed.), *Cognitive dissonance: Reexamining a pivotal theory in psychology* (2nd ed., pp. 3-24). American Psychological Association. <https://psycnet.apa.org/doi/10.1037/0000135-001>
- Hou, K., & Moskowitz, T. J. (2005). Market frictions, price delay, and the cross-section of expected returns. *Rev. Financ. Stud.*, 18(3), 981-1020. <http://dx.doi.org/10.1093/rfs/hh023>
- Kamyabi, Y., & Javady Nia, A. (2021). Investigating the effect of moderating managerial ability on the relationship between investor sentiment and accounting conservatism. *Accounting and Auditing Review*, 28(1), 102-134. <https://doi.org/10.22059/acctgrev.2021.307335.1008411>
- Kim, O., & Verrecchia, R. E. (1994). Market liquidity and volume around earnings announcements. *Journal of Accounting and Economics*, 17(1-2), 41-67. [https://doi.org/10.1016/0165-4101\(94\)90004-3](https://doi.org/10.1016/0165-4101(94)90004-3)
- Komalasari, P. T., Asri, M., Purwanto, B. M., & Setiyono, B. (2023). *The contingency effect of cognitive dissonance on the relationship between information asymmetry, regret, and herding behavior*. <https://dx.doi.org/10.2139/ssrn.4474470>
- Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics*, 39(1), 163-197. <https://doi.org/10.1016/j.jacceco.2004.11.002>
- Li, Z., Wen, F., & Huang, Z. J. (2023). Asymmetric response to earnings news across different sentiment states: The role of cognitive dissonance. *Journal of Corporate Finance*, 78, 102343. <http://dx.doi.org/10.1016/j.jcorpfin.2022.102343>
- Ling, D., Naranjo, A., & Scheik, B. (2010). *Investor sentiment and asset pricing in public and private markets*. 46th Annual AREUEA Conference Paper, Available at SSRN: <https://ssrn.com/abstract=1717110>
- Livnat, J., & Mendenhall, R. (2006). Comparing the post-earnings announcement drift for surprises calculated from analyst & time series forecasts. *Journal of Accounting Research*, 44(1), 177- 205. <https://doi.org/10.1111/j.1475-679X.2006.00196.x>
- Ng, J., Rusticus, T. O., & Verdi, R. S. (2008). Implications of transaction costs for the post-earnings announcement drift. *Journal of Accounting Research*, 46(3), 661-696. <https://doi.org/10.1111/j.1475-679X.2008.00290.x>
- Ng, J., Tuna, A. I., & Verdi, R. S. (2013). Management forecast credibility and underreaction to news. *Rev. Acc. Stud.*, 18(4), 956-986. <https://dx.doi.org/10.2139/ssrn.930697>
- Pastor, L. & Stambaugh, R. (2003). Liquidity risk and expected stock returns. *Journal of Political Economy*, 111, 642-685. <https://doi.org/10.1086/374184>
- Peng, Z., Johnstone, D., & Christodoulou, D. (2020). Asymmetric impact of earnings news on investor uncertainty. *Journal of Business Finance & Accounting*, 47(1-2), 3-26. <https://doi.org/10.1111/jbfa.12428>
- Penman, S. H., & Zhang, X. J. (2002). Accounting conservatism, the quality of earnings, and stock returns. *The Accounting Review*, 77(2), 237-264. <https://doi.org/10.2308/accr.2002.77.2.237>
- Perlovsky, L., Cabanac, A., Bonniot Cabanac, M-C., & Cabanac, M. (2013). Mozart effect, cognitive dissonance, and the pleasure of music. *Behavioural Brain Research*, 244, 9-14. <https://doi.org/10.1016/j.bbr.2013.01.036>
- Perotti, P., & Wagenhofer, A. (2014). Earnings quality measures and excess returns. *Journal of Business Finance & Accounting*, 41, 545-571. <https://doi.org/10.1111/jbfa.12071>
- Richardson, S. A., Sloan, R. G., Soliman, M. T., & Tuna, I. (2005). Accrual reliability, earnings persistence and stock prices. *Journal of Accounting and Economics*, 39(3), 437-485. <https://doi.org/10.1016/j.jacceco.2005.04.005>
- Riedl, E. J., Sun, E. Y., & Wang, G. (2021). Sentiment, loss firms, and investor expectations of future earnings. *Contemp. Account. Res.*, 38(1), 518-544. <http://dx.doi.org/10.1111/1911-3846.12618>
- Savor, P., & Wilson, M. (2016). Earnings announcements and systematic risk. *The Journal of Finance*, 71(1), 83-138. <http://dx.doi.org/10.2139/ssrn.1786308>
- Seok, S. I., Cho, H., & Ryu, D. (2019). Firm-specific investor sentiment and daily stock returns. *The North American Journal of Economics and Finance*, 50, 100857. <https://doi.org/10.1016/j.najef.2018.10.005>
- Sloan, R. G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review*, 71(3), 289-315. <https://doi.org/10.12691/jfa-6-1-4>
- Tahernezhad, F., Najafi, A. A., & Mohseni, H. (2022). Market timing by considering the investor sentiment index in Tehran Stock Exchange. *Financial Management Perspective*, 12(37), 175-204. <https://doi.org/10.52547/JFMP.12.37.175>
- Tohidi, M. (2020). Extracting composite sentiment index for Tehran Stock Exchange. *Journal of Asset Management and Financing*, 8(2), 49-68. <https://doi.org/10.22108/amf.2019.116219.1402>
- Vahedian, M., Masihabadi, A., Mehrazin, A. R., & Shoorvarzi, M. R. (2022). Investigating the role of uncertainty on the relationship between investors' sentiment and managers' behavioral bias in earnings forecasting. *Empirical Research in Accounting*, 12(3), 313-338. <https://doi.org/10.22051/jera.2021.34931.2804>